

## ABSTRACT

A method and apparatus for the treatment of coal to form a valuable product gas such as methane ( $\text{CH}_4$ ), that may be augmented with hydrogen gas, and a high purity carbon product. The coal feedstock can advantageously be a  
5 low-grade coal that contains high levels of impurities. Reactants and by-products are advantageously recycled within the process system to enhance the economics of the process.